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Name of Scholar:	Jongsoon Koo
Department:	Psychology
Name of Co Supervisor	Dr. Elizabeth Thomas
Names of Research Advisory Committee: 1. 2. 3.	
Name and Designation of External Reviewer if applicable:	
Date of Synopsis Presentation:	
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Head of Department

Date of approval by Doctoral Committee:

Director Centre for Research

Abstract

This study involved development of an art therapy application (app) and explored the effect of art therapy using the app, for children to enhance their self-esteem. App called ‘Art about Me’ was designed by an art therapist to meet the needs of art therapists and clients. After developing the app, three school counselors who participated in an art therapy workshop gave art therapy intervention using the app as a medium to improve the self-esteem of 16 children in school settings. The result of paired sample t-test indicated that art therapy using the app was significantly effective to improve their self-esteem. School counselors reported that intervention using the app was beneficial to confidentiality, building rapport, documentation, and ease of use. It was concluded that art therapy app would be a good solution to provide therapeutic services and to overcome the limitation of art materials for art therapy.

keywords: art therapy, app, children, self-esteem, India

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Introduction

Art therapy is an integrative therapeutic form that uses art making for anyone who needs the therapy to understand themselves, to cope with problems and to enhance their quality of life. Doing creative art activities provide opportunities for individuals to improve mental health, cognitive ability and sensory motor skills. Non-verbal communication promotes self-expression for people who can't express their problems in words. Benefits and goals of art therapy are to develop interpersonal and communication skills, to resolve conflicts, to manage behavior and emotion, and to enhance self-awareness and self-esteem (American Art Therapy Association [AATA], 2017; Buchalter, 2009; Wood, Molassiotis & Payne, 2011). Many researchers found effects of art therapy in clinical settings such as reducing depression and fatigue of cancer patients during chemotherapy treatment (Bar-Sela, Atid, Danos, Gabay, & Epelbaum, 2007) and anger and self-esteem of aggressive children (Alavinezhad, Mousavi and Sohrabi, 2014). Art therapy is also helpful in growth and development of foundation skills in socialization and learning through art activities for children with Autism Spectrum Disorder (Gabriel, 2003).

Art therapy can be employed for people of all ages and with any issue. Techniques of art therapy are used by counselors, psychologists, social workers, psychiatrists as well as art therapists (Malchiodi, 2003, p.1-3). Particularly, art therapy is effective with children. Art therapy is a non-verbal therapeutic process, so children don't find it difficult to express themselves. Slayton, D'Archer and Kaplan (2010) reviewed art therapy studies from 1999 to 2007, 26 studies of the 35 studies reviewed showed effectiveness of art therapy on behavioral problems for children and adolescents. Child-centered art making process, confidentiality and happy experience are important factors in art therapy for children (Deboys, Holttum & Wright, 2016).

Drawing, painting, collages, clay and play-doh are traditional art mediums. Pencils, markers, and crayons for drawing are familiar mediums from the pre-school age. Clients find it easy to express their thoughts and feelings in a comfortable environment. Painting gives freedom and flexibility to experiment with color and movement. Clients can experience texture and touch and use two- or three-dimensional materials through collages. Clay and play-doh are activities that use motor skills and help experiment with touch. In addition, puppets and masks,

multimedia and combining modalities such as music, movement and art are used to express and communicate creatively. Computer technology is the new medium in art therapy intervention. After being familiar with software, clients can enjoy it and express abstract images easily (Buchalter, 2009).

Computer technology and mental health

Computer technology and digital media are inextricably linked with modern human life. People can create a new production or a reproduction and share them with others by using a computer and internet. In art, computer technology is playing a significant role to produce and distribute the art forms as well (Blythe, Light & O'Neill, 2007).

Digital media highly impacts on not only human life but also medicine and mental health in the world. The health care professionals are using computer technology to conduct online interventions and to communicate with people who have physical and mental limitations to approach a specific location for their health care. The effects of computer mediated psychotherapy, cyber-therapy, web-counseling, tele-health, telemedicine, e-therapy, tele-psychiatry and cyber-counseling has become a new field of research recently (Malchiodi, 2000, p14-15).

Some researchers found that technology is used to deal with learning disorders and psychological behavior change. Computer assisted therapy was effective on scholastic skills for children with specific learning disorders (Vidyasagar & Kumar, 2013). Kraft, Schjelderup-Lund and Brendryen (2007) developed an individualized and interactive Digital Therapy Developer (DTD) to support behavioral change. It provided cost-effective personal therapy on a daily basis without having to meet therapists.

India also has a large number of digital media users and it is increasing now. We Are Social Singapore (2017), a survey agency, surveyed digital trends in Southern Asia. In India, there are 462 million internet users, it is approximately 35% of the population. 191 million are active social media users and 167 million are active mobile social users. 48% of the respondents are using internet every day and 30% are using it at least once per week. Internet users grew at 23% and active social media users and mobile social users grew at around 40 % since January 2016 in 2017.

Computer technology is being used to provide mental health service in India effectively.

Digital Media and Art Therapy

Digital media is used as a medium in art therapy. Engagement with digital art media increased among adults (Kaimal, Rattigan, Miller and Haddy, 2016). Digital art media was considered as a significant therapeutic tool by art therapists for creating, sharing and consuming art. Internet plays an important role in documenting, collaborating and sharing their creative art work.

Digital art media has many benefits when used in the therapeutic interventions (McLeod, 1999). Computer assisted art therapy provides chances to improve the clients' creativity and ways to organize the art work collection. There is no limitation for physical place and timing. Clients can feel free to express their emotions and thoughts with various tools and modify anytime without any mark or stain. Even the price of the software is not expensive, and it is not difficult to learn how to use the program. Moreover, clients could experience drawing for storytelling, painting for emotion expression, and sculpture for integration through computer art (Thong, 2007).

Digital art therapy is working effectively on children in various ways (Choe, 2017). Children don't feel any fear of making mistakes while expressing their thoughts and feelings with digital medium which provides various options. They experience more flexibility and engagement than traditional papers. They are allowed to use digital media in the sessions without negative judgments and therapeutic rapport is well established.

Despite the advantages of digital art therapy, technology is not used actively by art therapists in art therapy session. High cost of the device and unfamiliarity with the device were the main reason (Peterson, Stovall, Elkins and Parker-bell, 2005). Technology training for art therapists including ethical issues is needed (Orr, 2006; Orr, 2012).

Choe (2014) studied art making applications to suggest ideal features of it to satisfy art therapists and clients. Current art making applications, called art apps,

could not meet the needs of art therapists and clients. Those applications were developed not for therapeutic purpose but for creative art making activity. Art therapy apps need to be developed to satisfy the needs for practicing.

Some researchers already developed software or an application for art therapy. Browne, Bederson, Druin, Sherman and Westerman (2000) designed a computer-based finger-painting program for education setting. Mattson (2015) developed a mobile application, "Art therapy draw!" for art therapy based on two considerations of the art therapists: portfolio feature and security measures. However various tools to express various images, mixed media capability and function of analyzing artwork still need to be developed.

Children's Self-Esteem and Art Therapy

Self-esteem refers to the individual's global evaluation of the self (Rosenberg, Schooler, Schoenbach & Rosenberg, 1995). Global self-esteem is an attitude toward the self as a whole whereas specific self-esteem is an attitude to the specific aspects. Global self-esteem was associated with psychological issues such as depression, anxiety, life satisfaction, happiness and negative affective states while specific self-esteem was related with behaviors. Low self-esteem is related to problematic behaviors such as aggression, antisocial behavior and delinquency (Donnellan, Trzesniewski, Robins, Moffitt & Caspi, 2005). Self-esteem is clearly linked with a person's psychological condition.

Healthy self-esteem is an important factor for psychological stability, positive activity and psychological development of children (Hosogi, Okada, Fujii, Noguchi & Watanabe, 2012). Children's self-esteem is impacted by several factors such as family dysfunction, neighborhood and schools. Children are able to overcome their low self-esteem when they experience positive achievements continuously. Hence it is important to evaluate self-esteem and support children in the school to understand children's past and present conditions and to deal with their psychological problems.

Early intervention works effectively for children to build healthy and high self-esteem (Robins and Trzesniewski, 2005). Self-esteem enhancement program helped children to value themselves, others and the world better and it was useful to prevent poor academic performance, problematic health behaviors and abnormal

social behavior as well (Dalgas-Pelish, 2006).

Art therapy was found to be effective to improve social relationship and self-esteem among female adolescents who had committed serious crimes (Hartz and Thick, 2005). Participants experienced safety and comfort in self-expression that led to increased self-awareness and self-approval. They also were able to experience positive feeling such as success and pride, which they inculcated during the process of art activities.

Although there are a lot of benefits of art therapy intervention, limitation of traditional art medium and physical setting is a big obstacle to provide art therapy in India. Art therapy application using digital media could be an alternative art medium in therapeutic setting. Without traditional art materials, clients can express in the form of drawing, painting and collage. It is expected that art therapy application would be useful to conduct art therapy anytime and anywhere for art therapists, school counselors, and special educators.

Statement of the Problem

Based on the above literature we can conclude that computer technology is used in various ways to support therapeutic service. Art therapy, a holistic and creative approach, is also adopting technology in communicating with clients, sharing art forms and intervention.

The usage of digital art media and internet in art therapy are increasing now in creating, collaborating and sharing art works (Kaimal, Rattigan, Miller & Haddy, 2016). It was found that digital art media has a lot of benefits and positive impacts on building therapeutic rapport, improving creativity and self- expression, and being flexible in any environment (Choe, 2017; McLeod, 1999; Thong, 2007).

But due to the absence of the art therapy software and application, art therapists use commercial art making program. Art therapists and the clients are not satisfied with confidentiality and security of these programs. Unfamiliarity with the device, absence of technology training for art medium to students or trainees of art therapy, disconnection from social interaction and ethical issues are the main reason for art therapists not to use technology in their intervention as well.

In Indian context, the physical environment does not meet the ideal setting for traditional art therapy or art education. It is not easy to provide traditional art medium such as paper, pencil, crayon, paint and brush as art materials are expensive. Hence, taking into consideration all these aspects, there is a growing need to develop an art therapy application in India.

Justification for the Study

Art therapy is a holistic approach to help people explore and express themselves. It is effective to communicate with others, to improve well-being and to relieve negative emotions. People can express their thoughts or emotions that can't be expressed in verbal language. So art therapy works effectively with young children. Through art making process, therapeutic rapport is well established as well (Malchiodi, 2007, p.12-17).

Computer technology is already used by the health care professionals for online interventions and communication for people who have physical and mental limitation to approach the specific location for their health care. Digital media is considered as a new medium in art therapy. Particularly digital media can strengthen the therapeutic alliance between children and a therapist because they can use digital media without judgment (Choe, 2017). It is expected that hesitation for making art works is reduced as clients don't need specific skills to draw or paint in the traditional way but instead can create any types of shape or line with various options (McLeod, 1999).

In India, mental health service and programs are not well organized (National Institute of Mental Health and Neuro-Sciences, 2016). Lack of mental health experts, institutional care and rehabilitation programs are the problems for providing mental health service effectively. Technology based application for home care is one of the highly recommended solutions to resolve the problem. Technology use is growing fast in India. The number of people using internet and computer device are increasing rapidly. Spread of digital art media is more convenient and easier than supplying traditional art materials. Once an art therapy application is developed, it can be used by transcending space and time.

After development of application, effectiveness of the application will be

examined. Many researchers have already studied the effect of art therapy on self-esteem using traditional art mediums. The current study will determine the effect of art therapy using the application as a medium on self-esteem of children, thereby validating the effectiveness of the app. There is a need of developing art therapy application to meet the expectation in mental health care. It is hoped that development of an art therapy application will enable art therapists, school counselors and special educators to provide art therapy in their session with ease.

Review of Literature

The purpose of this chapter is to provide a contextual review of the extant literature on art therapy, the use of computers as a medium in art therapy practice for children and importance of self-esteem of children.

Overview of Art Therapy

Art therapy is a “powerful healing” to improve person’s well-being and daily lives, and to experience therapeutic progress (Malchiodi, 2007, p.21-22). It is effective to develop the sense of self awareness and to enhance emotional transformation.

There is ample research that supports the effectiveness of art therapy on various symptoms. Uttley, Stevenson, Scope, Rawdin and Sutton (2015) suggested that art therapy is an effective therapy for non-psychotic mental health problems such as depression, anxiety and phobias. Foa (2009) also found that art therapy is useful to work with children who have experienced trauma. Art making process is effective to access to trauma related experiences and it provides opportunities to express children's internal thoughts and feelings using by nonverbal language.

Nonverbal and creative art activity is a safe way to approach children who are not able to express themselves effectively (Waller, 2006). It can help children explore and express their emotions through the brief history and theoretical perspectives of art therapy. Visual art making process provides the opportunities of learning and alternative way to communicate with others in positive ways. Children can transform their negative feelings into the object which can be shared with a therapist. It also helps children with ASD to improve communication skills, self-image and learning skills (Schweizer, Kmorth & Spreen, 2014). Children became more flexible and relaxed at home and at school. They showed less anxiety and less anger while improving sensory and emotional regulation.

Digital Media and Computer Technology in Mental Health

The more computer users are increasing, the more concern and issues are raised. Especially for children, the effects of using computer are very complicated. Subrahmanyam, Kraut, Greenfield and Gross (2000) reviewed articles to understand the effects of home computer use among children. Some studies found there were

negative impacts on physical well-being such as obesity, seizures and hand injuries. Playing violent computer games influence aggressive behaviors among children. Using internet for a long time was related to increases in depression. On the other hands, some studies showed that computer games with rapid movement, interaction and imagery influenced visual intelligence skills positively. Moreover, computer became an important educational source these days. Use of home computer was linked with better academic performance. So, the researcher suggested that amount of time spent, type of activity and the contents should be considered and managed while using computers to get benefits.

Hind and Sibbald (2015) identified benefits of smart phone application in mental health. First of all, patients and doctors experienced usability and functionality of apps. It was also helpful for doctors to understand their patients' condition and to communicate with them. Second, people preferred to use application and were willing to use it more frequently. Third, application was useful to monitor patients' symptoms accurately. Fourth, psychological intervention such as cognitive behavioral therapy, dialectical behavioral therapy, and acceptance and commitment therapy were applied to smart phone applications. Next, there was a positive impact on clinical outcomes such as depression, anxiety, stress and so on. Finally, application could allow many people to access to mental health care. To get successful results, application must be individualized and include adaptive learning. Feedback, professional counselor support, and technical support were important factors too. Long-term adherence and confidentiality were barriers for using an application.

Digital Media in Art Therapy

Choe (2017) suggested benefits of using digital art media in the intervention. For young clients, it provided freedom to use digital media without judgment, so it was effective to strengthen therapeutic alliance. Clients could experience control and freedom over their work without the fear of making mistakes and use his cognitive and creative skills. Clients also could feel free to take various options, such as types of canvas or pressure-sensitive stylus. Convenience, forming healthy habit, self-assessment and self-monitor were the additional advantages.

Even if effects and benefits of digital media in art therapy are well known,

usage of it in sessions is still lower than general usage. Orr's research in 2006 found the reasons for not using technology in sessions: the high cost of equipment, a lack of value for technology and art making in their agencies, limited time for use and training, not being comfortable with the media, and disconnection from sensory needs. Orr's study in 2012 mainly suggested that ethics and confidentiality issues of digital art media need to be focused on and training needs to be given to users. Kaimal, Rattigan, Miller and Haddy (2016) also point out that students or trainees of art therapy need to learn the characters and ethics of digital art therapy.

When developing software to be used in clinical setting, it should be designed by therapists and used under the guidance of therapists (Matthews, Doherty, Coyle & Sharry, 2008). It has to have a locking system to protect data which should not be accessed by others to meet the ethical consideration. This software can be used easily and technical support must be provided. Choe (2014) also support that art therapy application must be developed to meet needs of therapeutic purpose. It must include various options to create art and immediate responsiveness of control for easy and simple operation. The function of art therapist's control over the apps, portfolio, recording the art making process, digital library such as sticker, and confidentiality must be included.

Current Digital Software for Art Therapy

Mihailidis et al. (2010) developed art therapy applications which had three different types of software based on the results of the survey for adults with dementia. The system embodied the ideas: focusing on paintings and drawings that adults with dementia liked the most, enabling users to self-select activities and adding option of co-work with art therapists.

Mattson (2015) developed a mobile application, "Art therapy draw!" for art therapy based on two considerations of the art therapists, portfolio feature and security measures. There is a save icon to organize the clients' art work. Art therapists or clients can set up the password to save their art images to maintain confidentiality. It was easy to operate the application in drawing, setting up password, and saving images in secure folder. However, various tools to express various images, mixed media capability and function of analyzing artwork have to be developed.

Digital Art Therapy in India

In Indian settings, it is not easy to set an ideal physical environment such as lighting, water supply and calm space for art therapy or art education in general (Prasad, 2008, p. 81). Especially in school, there are many students in a classroom and facilities are limited. Counseling settings are not much different.

Digital art therapy can be conducted anywhere and anytime without extra effort such as preparing traditional art materials or cleaning up (McLeod, 1999). The biggest benefit of it is that clients don't need to have specific art skills. Clients can create any lines and shapes with various tools: brush strokes, air brush and so on. Even if children are not confident about art skills due to absence of learning art before, they can try different tools to create their own artwork and modify them anytime without any mark or stain. Their art work can be saved in stages, copied, shared and stored. It is believed that digital art therapy will provide effective psychological service in India.

Children's Self-esteem and Art Therapy

It is important to distinguish global self-esteem from specific self-esteem (Rosenberg, Schooler, Schoenbach & Rosenberg, 1995). Global self-esteem is associated with psychological well-being, whereas specific self-esteem is more related to better behavior and academic performance. So, these two types of self-esteem cannot be used interchangeable. It is necessary to understand the nature of global and specific self-esteem to design and provide appropriate interventions. Rosenberg Self-Esteem Scale was developed to measure global self-esteem.

Rosenberg, Schooler and Schoenbach (1989) studied the relationship between self-esteem and adolescent problems, juvenile delinquency, poor school performance and depression. The results showed that self-esteem was most associated with psychological symptoms and depression. The relationship between them was bidirectional. Sukumaran, Vickers, Yates and Garralda (2003) also found lower global self-esteem among children and adolescent psychiatric patients who had psychological problems such as anxiety, depression, conduct disorder and hyperkinetic disorder than children in the community.

According to Donnellan, Trzesniewski, Robins, Moffitt and Caspi, there was a strong relation between global self-esteem and problematic behaviors (2005). Low self-esteem was highly related to aggression, antisocial behaviors and delinquency. Moreover aggression could be predicted by self-esteem in the future.

Self-esteem changes across the entire life span (Robins, Trzesniewski, Tracy, Gosling & Potter, 2002). Self-esteem is increased by self-verification process which occurs when group-based identities match the meanings in their identities (Cast & Burke, 2002). Self-verification that is a personal process is influenced by social groups and relationships. If individuals fail to verify their identities constantly, their self-esteem decreases, and individuals become more vulnerable to negative impacts.

Rosenberg Self-Esteem Scale has been used to measure children's self-esteem in Indian context. To examine effects of self-esteem in children with Dyslexia aged between eight to fourteen years, Rosenberg Self-Esteem Scale was administered (Jesna & Edward, 2014). It was also used to study self-esteem and academic achievement of urban and rural students aged 12 to 14 years in Varanasi District, India (Joshi & Srivastava, 2009).

Art therapy was effective for children who showed aggressive behaviors to enhance their self-esteem and to reduce their anger (Alavinezhad, Mousavi & Sohrabi , 2014). Group art therapy enhanced self-esteem and reduced aggressiveness and behavior problems among adolescents who received probation order due to delinquency (Lee, 2016; Mun & Hong , 2015).

According to the literatures, usage of computer technology is increasing rapidly in communication, workspaces, education and mental health service. In art therapy intervention, digital application can be used effectively to provide therapeutic service to children. Due to the absence of art therapy application, needs of art therapists and clients are not satisfied yet regarding confidentiality and the function of therapists' control over the process. These studies supported the need of an art therapy application to be developed in collaboration with an art therapist and software developer to satisfy the needs of art therapist and clients.

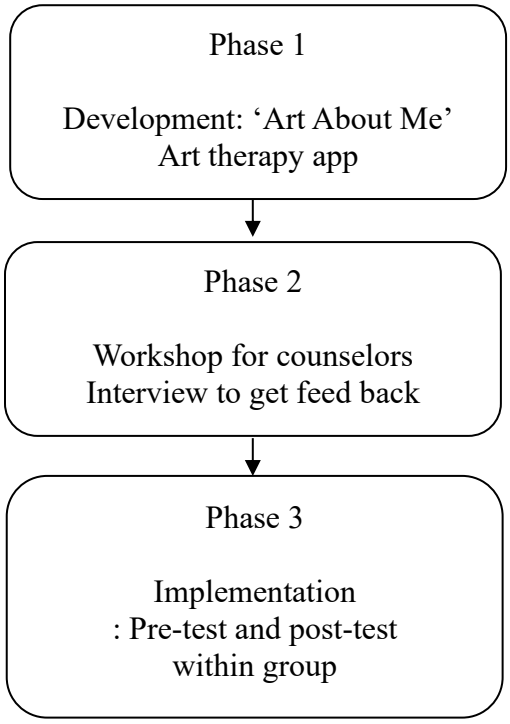
Method

Objective of the study

The objective of the study is to develop an art therapy app for tablet pc to satisfy the needs in art therapy intervention and to examine the effectiveness of an art therapy intervention using the app on children's self-esteem.

Research design

To achieve the objectives of the study, there were three phases for main investigation.



Procedure

Phase 1. Art therapy app for tablet pc was designed by the researcher. The researcher is a certified art therapist with the Korean Art Psychotherapy Association. Technical assistance for the app was provided by a developer from the Centre for Digital Innovation according to the manual that was provided by the researcher. This is an Android app for free download.

The name of the app is "Art about Me". Some researchers had already given

suggestions to develop a software for therapeutic settings (Browne, Bederson, Druin, Sherman & Westerman, 2000; Choe, 2014; Matthews, Doherty, Coyle, & Sharry, 2008). To satisfy the needs of the art therapy app, an art therapist designed this app and confidentiality was strengthened. Using the application, drawing, taking pictures and editing are available with various tool and controllers. The characters of this app are as follows.

- Confidentiality: After installing the application, therapist can register as an administrator. Clients can create their own account with names and password. Only administrator can access data, the lists of clients and their drawings with time order.

- Making journal: After completing art works, clients can save their work with a title, comments and date. They are able to make their own portfolio with their journal.

- Backing up system: Administrator can back up the data in SD card of the device.

- Ease of use: With little guidance by the instructor, it is easy to log-in, to use and to make journal for clients. Drawing, taking pictures and editing are easy to use.

- Digital accessories: Emotion stickers, taking photos and editing are available.

Phase 2. After developing the app, two days intensive training workshop was conducted for school counselors. The participants of the workshop were members of a psychotherapeutic center which provides professional psychological services in Bengaluru. One teacher and seven counselors participated in the workshop. Basic art therapy, introduction to ‘Art about Me’ and the manual of the intervention for improving self-esteem of children were included. Brief contents of the workshop are as follows:

Workshop – Day 1

- What is Art therapy?
- Understanding children’s drawing and developmental stages in Art

- Art-based assessment: HTP test, KFD tests
- Understanding Art Materials
- Case study

Day 2

- Understanding Art Therapy App and how to use ‘Art about Me’
- Seven sessions of Art therapy intervention on self-esteem for children were introduced. This program was supervised by an expert. Details are as below.

Table 1

Seven sessions of Art therapy intervention on self-esteem for children

Session	Topic	Procedure / Goals
1	Introduction: Art about me Free drawing	Client becomes familiar with application through free drawing. In the warm atmosphere, he/she express his/her emotion and thoughts.
2	Self-portrait	Using a camera and emotion stickers of application, client takes a selfie and edit it. Goals include enhancing self-awareness and self-esteem by exploration of self, facial expression, emotion and understanding his/her interests, personality, strength and weakness.
3	Body scan (Soothing music will be given)	In the beginning, ask clients to close eyes and relax his/her body part with deep breaths. After body image scanning, client takes a full body picture and decorates the body and background. Goals include learning how to relax the body, understanding the beauty of the body and appreciating the body.
4	Draw myself as a	In the beginning of the session, discuss

	superhero	various superheroes such as Superman, Spiderman and Wonder-woman. Ask client to draw himself/herself as a superhero focusing on characters, strengths and powers. After drawing, discuss the reason why he/she chooses the character and what strengths and power can help others. Explore if there are some similarities between a superhero and the client. Goals include enhancing self-awareness and self-esteem by exploring his/her strengths.
5	The happiest moment & saddest moment	Client thinks about the happiest and saddest moments they had before and draw it. Through this process, client can explore his/her thoughts, emotions and behaviors that influence his/her day. Goals are increasing awareness of the factors that impact life and learning how to balance the good and bad that they face.
6	The first smile	Ask client to draw the first person who smiled at him/her or brought a smile to his/her face. Help client remember the person and express appreciation to people. Goals include learning to appreciate people and having a positive perspective to see the world.
7	Yourself in the future	Instruct client to draw him/her self after 10 and 20 years. Encourage client to think and to draw in detail: family, friend, name

	card and costume related a job in the future. Goals include giving opportunities to think self in a positive and detail. While hoping for the future, intervention is terminated.

The sessions were designed by the researcher based on the previous studies about art therapy for improving self-esteem and supervised by the art therapist. Tablet pcs with app were distributed to school counselors. They trained how to use the app and practiced it during the workshop. Feedback of the app was gathered from counselors as below and the app was revised based on it. The validity of the app was ensured by this process.

Table 2

Feedback and Solution

Feedback from counselors	Solution
Redo / undo function needed.	Redo / undo developed.
After selecting brush types, it will be good to show which brush is selected.	Applied.
Pixel size is too big to draw details.	Varied brush size from 1 to 99
Is it possible to use stylus?	Finger drawing is available. In case device has its own stylus, it will work.
Backing up system -Is it possible that two data can be emerged? -Can we import data into existing app without uninstalling and reinstalling?	Data can be exported any time, but only when the app is installed, data can be imported. Currently, it is not possible that two data are emerged.

The revised app, ‘Art about Me’ is as follows. After downloading the app, instructor can create his/her own account. If there is a previous data which was exported before, the instructor can select a data file and restore it (see *Figure 1*).

Figure 1. Open page: The instructor's account and backing up system

Each client can create their own account to participate in the art therapy intervention (see *Figure 2*). Whenever clients want to access the app, they have to log in with their name and password. Clients can draw on a tablet and use drawing functions with ease such as brush, eraser, colors and camera (see *Figure 3*). After completing a drawing, they can save their drawings with date and comments about their work (see *Figure 4*). Only an art therapist who has an admin ID can open the list of clients and their work. When the art therapist logs into the app, he/she can see the client list. If he/she clicks on the name of the client, he/she can see the drawing list of the client (see *Figure 5*). Client's drawing is shown with topic and comments (see *Figure 5*).

Figure 2. Client registration page

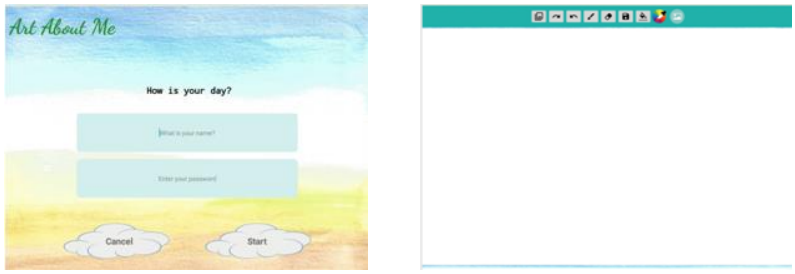


Figure 3. Start (Login) page & main drawing page

Figure 4. Save

Figure 5. List of clients and list of drawing

Figure 6. Client's drawing

'Art about Me' would meet the needs of therapist and clients. It is easy to use for children and has various options. Confidentiality, making journal and backing up system are included. The app is not a game and clients used the app only under the guidance of the counselor for therapy purpose. Therefore, there is no concern over any sort of addiction to the app.

Phase 3. In the implementation phase, art therapy using application as a medium was conducted for 16 children by three school counselors in different schools. The counselors who have more than two-year experience participated in this study. All 16 children completed all the art therapy sessions. Seven school counselors were trained in the workshop, but four counselors didn't join the study due to their personal issues. Following the approval from the Institutional Review Board (IRB), permission was obtained from schools and informed consent was collected from parents.

In the school settings, school counselors deal with various emotional and psychological problems of children. Global self-esteem is highly associated with psychological symptoms such as depression, anxiety and life-satisfaction. Children's self-esteem can be enhanced effectively by early intervention and it is related children's psychological conditions. Hence, self-esteem was studied in this study and Rosenberg self-esteem scale was used to measure global self-esteem. After one week of the pre-test, school counselors used the art therapy application in their sessions with their clients who were referred to them by class teachers at school. One week after the intervention, post-test of children's self-esteem was measured with Rosenberg self-esteem scale.

Hypothesis

There is no improvement on self-esteem in children after the art therapy intervention using the art therapy app, 'Art about Me'.

Operational Definition

App. App refers to "an application for a mobile phone" (Merriam-Webster, 2019). In this study, android application for a tablet pc was developed by the researcher and a developer from the Center for Digital Innovation (CDI) in Christ University.

Self-esteem. In this study, self-esteem refers to "the individual's positive or negative attitude toward the self as a totality". It is a general feeling of self-worth (Rosenberg, Schooler, Schoenbach & Rosenberg, 1995).

Sample and Sampling

Population of the present research is children belonging to the age group of eight to fifteen. Representative sample of 16 children was chosen by using purposive sampling. These children were referred by teachers due to their problems such as bullying, academic problem or behavioral problem at school.

Inclusion criteria. Inclusion criteria is as below

1. Children between the age ranges of eight to fifteen took part in the study.
2. Children were the clients of school counselors who have undergone the art therapy

training workshop.

Exclusion criteria. Exclusion criteria is as below.

1. Children who were identified with Autism spectrum disorder, mental retardation and developmental disorders by school records.

2. Children who were under counseling other than current art therapy intervention.

Instrument

Self-esteem was assessed pre - post the intervention to determine the effectiveness of the art therapy application for children.

Rosenberg Self-Esteem Scale. Rosenberg self-esteem scale, developed by Morris Rosenberg in 1965 is a ten-item scale for measuring stable sense of personal worth. It is a four-point Likert scale format which contain positive and negative questions ranging from strongly agree to strongly disagree. The higher scores indicate greater levels of self-esteem.

The Rosenberg self-esteem questionnaire was conducted on Indian adolescents aged twelve to fourteen (Joshi & Srivastava, 2009) and Dyslexic children aged eight to fourteen (Jesna & Edward, 2014).

Data Analysis

Paired sample t-test was used to analyze children's self-esteem in phase three. Content analysis was used to analyze the art therapy intervention.

Ethical Consideration

- Theory and practical training of art therapy was provided to counselors who participated in this research.
- Informed consent was obtained from children and their parents prior to the study.
- Confidentiality was strictly maintained.
- The physical and psychological health of the participants during the study was taken care of.

- On requests by the participants, the results of the study were debriefed to them.
- Copyright for the App was clearly confirmed.

Results

Three school counselors conducted art therapy intervention using the app "Art about Me" to 16 children. Before and after the intervention self-esteem was measured to explore the effects of art therapy with the app. The analysis of the results is presented below.

The Results of Paired Sample t-test

The difference scores for the pre-test and post-test were normally distributed, as assessed by Shapiro-Wilk's test (p=.301). Hence, paired sample t-test was performed to determine the effect of art therapy intervention with the app for children to improve their self-esteem. IBM SPSS statistics 20.0 version was used for analyzing the data.

Table 3

Descriptive Statics for sample (N=16)

	N	Mean Age
Boy	11	11.64
Girl	5	12.60

Data was gathered from sixteen children in school. The age group was eight to fifteen and there were eleven boys and five girls.

Table 4

Paired Sample t-test Results: Mean, N, SD, df and t-value of paired differences between pre-test and post-test of self-esteem

	Pre-test M	Post-test M	Pre-test SD	Post-test SD	*t*	*df*
Outcome	11.00	18.50	2.83	2.39	11.28*	15

**P<0.01*

Table 4 indicated that there was a statistically significant difference in self-esteem scores before and after art therapy intervention. Self-esteem increased by an average of about 7.5 after the art therapy intervention, *t(15)=11.28, p=0, r=.49,*

d=2.82.

The Results of Intervention for Each Session

Children were referred by teachers with various issues and following are their presenting problems. Some of children had multiple problems.

Table 5

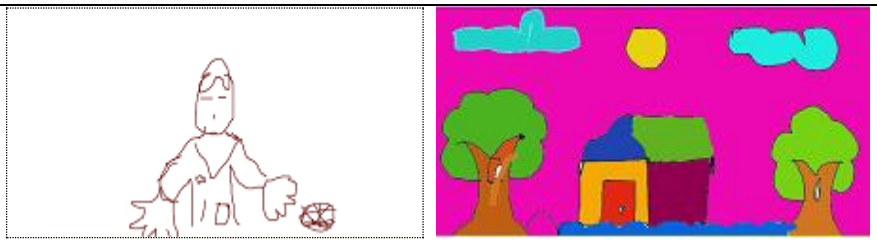
Children's presenting problems

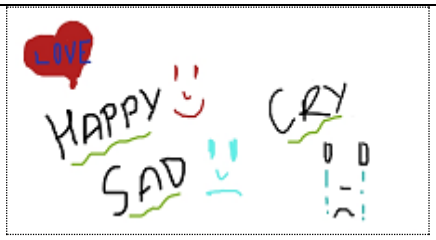
Presenting problems	Frequency
Feeling inferior to others	1
Feeling inferior to others in studies	5
Feeling inferior to others in appearance	5
Feeling low	4
Feeling disturbed	1
Feeling sad	2
Feeling angry	1

Drawings of children and progress notes were recorded after each session.

Table 6

Session one

	Contents
Topic	Introduction : 'Art About Me' Free drawing
Goals	Client becomes familiar with application through free drawing. In the warm atmosphere, he/she expresses his/her emotion and thoughts.
Drawings	

	D	E
		
	H	O
Progress	• D : D felt excited that he drew himself as a goal keeper on the tablet and someone listened to him with patience. • E : E was a bit nervous while drawing on the tablet, but became better after seeing the images what she drew. • H : H felt very happy and was surprised to get a tab for a drawing. He never expected of getting a chance to use the teacher's tab to draw. • O : O drew the emotions what she feels usually.	
School counselor's evaluation / Analysis	• The children took some time to get familiar with the app but they were able to understand how to use it and do well as it was free drawing. • Using the app made them feel comfortable and excited, and helped building rapport. It helped counselor easily understand their clients.	

Session one was designed to help children get familiar with the app. Children were allowed to draw anything they wanted to draw. Three children reported that it was not easy to understand how to use the tab in the beginning. But most of children were excited to draw on the tab and opened up to the counselors. Counselors also felt that using the app in the session helped to build rapport with the children.

Table 7

Session two

	Contents
Topic	Self-portrait
Goals	Goals include enhancing self-awareness and self-esteem by exploration of self, facial expression, emotion and understanding

	his/her interests, personality, strength and weakness. Using a camera and emotion stickers of application, client takes a selfie and edit it.
Drawings	 A B F G
Progress	• A : A wanted to make himself have a fair complexion while editing his picture. • B : B was very shy while taking her picture as she thought she is not beautiful. • F : F was happy in this session. He was able to talk about his strengths and weakness. • G : G was happy to see himself on the tab.
School counselor's evaluation / Analysis	• Children were happy to take selfie. • Some children showed their inferiority about their photo. • They were conscious about how they looked and wanted to choose a better one. When they edited pictures, they felt happier. • It was effective for children to talk about their strengths and weaknesses.

In the second session, children took photos of them and edited it with stickers, drawings and frames. Counselors reported that it provided good opportunities for children to think about their hopes, characteristics, interests, strengths and

weaknesses. Children were able to choose a picture that they wanted to edit. They didn't worry about their mistakes and felt free to draw and edit until they were satisfied with their work. They were comfortable to make changes on their work.

Table 8

Session three

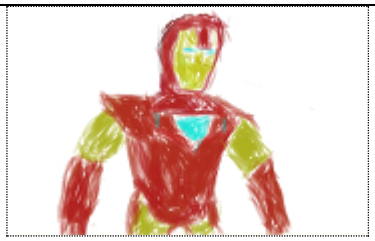
	Contents	
Topic	Body scan	
Goals	Learning how to relax the body, understanding the beauty of the body and appreciating the body.	
Drawings		
	C	I
	N	P
Progress	• C : C expressed that she loved sun shine. She wanted to color in her life. • I : I loved taking pictures. • N : N felt calm and relaxed. • P : P didn't express her emotions easily before, but she said she felt quite good.	
School counselor's evaluation /	• It was very effective for the clients to relax. • It helped them think and feel their emotions and learn how to love themselves.	

Analysis	• It helped them to reduce their shyness gradually and to have a positive body image. • They were excited, motivated and confident when they edited the photos to make them look better. It seemed they could relate it with themselves to change to a better person.

In the third session, counselors started reporting their confidence, motivation and positivity. Children were more relaxed and expressed more honest feelings because they were able to do their artwork with ease. Children were motivated when they edited their selfies and showed more confidence in themselves. They started to believe they can be better, when they edited the images for them to look better.

Table 9

Session four

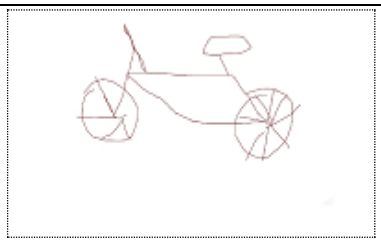
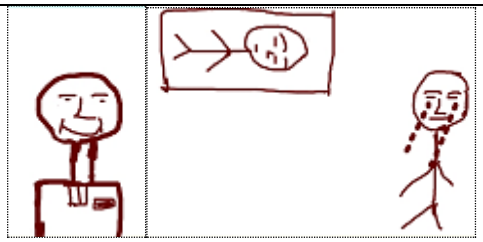
	Contents
Topic	Draw myself as a superhero
Goals	Enhancing self-awareness and self-esteem by exploring his/her strengths.
Drawings	A E  G H
Progress	• A : A said he was lonely when he was drawing but he has a power. He expressed his feelings and wishes honestly. • E : She understood that she can also help friends and protect them. That made her happy. • G : G drew a picture of Iron man who has the power to

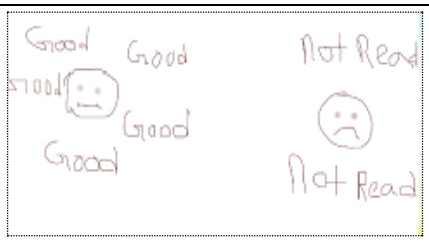
	help others. G found similarities between Iron man and himself. Iron man could make models with metals and G could make models with clay. Both of them wear glasses. G said, “I can also help others just like Iron man.” • H : H drew a character called Sinchan with his favorite colors. H wanted to make others laugh through jokes like this character.
School counselor’s evaluation / Analysis	• This was the best part of the intervention where the students discussed about their role models. • This activity made them feel more motivated and happy. • They were able to identify their good qualities to make others happy. • Some children related the superheroes to their parents, teachers or football players who gave them more confidence.

Session four provided good opportunities for children to think about their good qualities. They were able to reflect on their own strengths that they can make use of to help others like superheroes. Moreover, they thought that how they can spread happiness and how they can help others. They became more confident and motivated.

Table 10

Session five

	Contents
Topic	The happiest moment & saddest moment
Goals	Awareness of the factors that impact life and learning how to balance the good and bad that they face.
Drawings	 
	D F

		
	C	O
Progress	• D : D's happiest moment was when his mother bought a cycle for him. He was able to reflect how both good and bad things happen and that can be handled. • F : When F was selected as a class leader, He was very happy. His saddest moment was when his mother passed away. While drawing the saddest moment he felt sad and the related emotions were processed. His good memories with his mother helped him be calm and motivated. • C : When anyone praised her, she was happy especially by school teachers about her studies. When she didn't study, they scolded and she became very sad. • O : O's happiest moment was his birth day party and the saddest moment was when he got a school report.	
School counselor's evaluation / Analysis	• This session was a little bit more difficult for children. But after giving them some examples, they were able to think of their own moments. • They talked about what made them happy or sad and the meaning of the people and the moment. • Children were able to realize and understand how they can balance both.	

In the fifth session, children explored their thoughts, emotions and behaviors while thinking and drawing the happiest and saddest moments. It was not easy for some children to think about their lives deeply. Some examples which were given by the counselors were helpful for them to think about their own lives. They were able to relate the moments with their emotions and understand when they feel happy and sad clearly. They talked how they would balance their life well. When F remembered the time that his mother passed away, he had to face intense feeling. But he was able to

remember his mother's smile and appreciate all the moments with her. He became more motivated to see the positive things in people.

Table 11

Session six

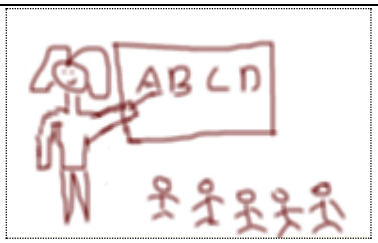
	Contents
Topic	The first smile
Goals	Help client remember the person who showed hospitality and express appreciation to people. Goals include learning to appreciate people and having a positive perspective to see the world.
Drawings	 J K L M
Progress	• J : J drew his friend who made J smile. • K : K drew his mother who made K smile. • L : L drew his uncle whom he was proud of. L wanted to be a person like his uncle. • M : M drew his mother who made him smile. When he remembered his mother's smile, he felt confident.
School counselor's evaluation / Analysis	• This was more effective for children to think of not only their parents but also their peers whom they consider as important sources for all that they do. • Children learned how to appreciate even small things that

	made them feel good. • Children were able to value their friendship.

In this session, children had opportunities to think about people who showed hospitality to them. They felt warmth and gratitude and expressed their appreciation. It helped them see world in a positive way. Moreover, children wanted to be someone who can be nice to others.

Table 12

Session seven

	Contents
Topic	Yourself in the future
Goals	Giving opportunities to think of self in a positive and detailed manner. While hoping for the future, intervention is terminated.
Drawings	 C D F G
Progress	• C : C talked about an ideal teacher that she wanted to be. • D : D enjoyed drawing his future. He said, he wanted to be a football player or an army man. He understood how qualities and hard work would be more important than good looks to achieve his goals. • F : F drew himself as a scientist and it was further explored and processed. • G : G reported that he felt proud as this session made him

	to imagine what he wanted to be and what his hope for himself was. He wanted to become a famous cartoonist when he is 20 years old. In the drawing, he is standing by his good car.
School counselor's evaluation / Analysis	• Some children had to think about their future and draw it. • This helped children look at themselves in a positive and a confident way. • Children became more motivated and confident for their future.

The last session was designed to terminate the art therapy intervention for giving hope, motivation and confidence. While thinking and drawing their future, children became more confident and motivated by their ambition. They were able to think about their good capabilities and what they have to make efforts for their future. For example, D reported that there were more important things than good appearance. With hope, confidence and pride, art therapy intervention was terminated.

Discussion

The current study developed an art therapy application to meet the needs of art therapists and clients and to explore the effect of art therapy using the application for children in school setting. Existing commercial art apps did not match the needs of clients and art therapists so far because it was not developed to be used in clinical setting. In this study, art therapy app, 'Art about Me' was designed by the art therapist and technical support was provided by a developer from CDI in Christ University. Ideal characteristics of an art therapy app, such as confidentiality, making journal, backing up system, ease of use and digital accessories were included. For confidentiality, when the app is installed, an art therapist must create his/her admin id and password to control over the app. Only the art therapist who has an admin id can access clients' data, portfolio (Choe, 2014). Concern about training for therapists (Orr, 2006; Orr, 2012) was taken care of by providing art therapy workshop to school counselors, they were able to learn how to use the app in their session

Counselors who participated in this study reported that there were more benefits of using the app in the sessions. They reported that it was very helpful to build therapeutic alliance with young clients. Clients were excited to use digital device and draw with the app. It helped them open up and express their emotions and thoughts naturally (Choe, 2017; Thong, 2007). Using app also helped enhance autonomy and creativity (Kaimal, Rattigan, Miller & Haddy, 2016)

Counselors also reported being satisfied with the ease of use and documentation. Clients became familiar with the program easily. The data also can be saved in the program and there is back up system. Art therapists who have an admin ID can access clients' data: list of clients and their drawings with comments. Usability, functionality and accessibility are benefits for using smartphone app in clinical setting (Hind & Sibbald, 2014).

16 children were referred to the counselors by schoolteachers due to bullying, academic issue or behavioral issue. Their presenting problems were feeling inferior to others, feeling inferior to others in studies, feeling inferior to others in appearance, feeling low, feeling disturbed, feeling sad and feeling angry. Self-esteem is highly associated with psychological issues (Rosenberg, Schooler & Schoenbach, 1989;

Sukumaran, Vickers, Yates & Garralda, 2003).

To deal with their various issues, art therapy workshop was designed to improve self-esteem. Children's self-esteem can be enhanced at schools or outside of the home (Hosagi, Okada, Fujii, Noguchi & Watanabe, 2012). Through seven sessions of art therapy intervention, all 16 children showed significant improvement in self-esteem. The app was used as the medium of art therapy, instead of using traditional art materials. The app was used by children under the guidance of the school counselor.

In the session one, children drew freely after learning how to use the app. They showed eagerness to learn and opened up fast. It was reported that three children found it difficult to use the app in the beginning, but most of the children were excited to use and draw with the app. Counselors reported using the app helped build rapport with children. In the session two and three, children had opportunities to understand their interests, personality, strength and weakness and their body image through taking pictures of theme and editing with various tools. They were able to choose the picture what they want to edit and make it better. It helped them be relaxed, reduce shyness and express their feelings more easily. In the session four, they tried to explore their strength by comparing themselves to superheroes and thinking of how to help others with their strengths. In the session five and six, children had opportunities to balance their lives, to experience warmth from others and to appreciate it. They could see the world in a positive way and be good to others. Last session was about drawing their future. They thought about their capabilities and shortcomings to grow They became more confident and motivated for the future. This result is in line with previous studies that art therapy is beneficial for enhancing self-esteem (Alavinezhad, Mousavi & Sohrabi, 2014; Lee, 2016; Mun & Hong, 2015).

Over the course of the intervention, children experienced understanding their thoughts, feelings and body images in a positive way. Counselors who participated in this study also reported children showed gratitude, motivation, and confidence to be a better person, and hope for the future. The app was useful to provide effective art therapy intervention for children in school setting even without any specific art materials. Counselors were willing to use the app in their sessions because the ease of preparation, documentation and building rapport. Digital based art therapy app holds promise for providing effective service (McLeod, 1999).

Conclusions

Art therapy is an integrative therapeutic form that is particularly effective with children in various settings. It helps enhancing self-esteem, psychological problems, interpersonal skills, attention and academic performance. Digital media is the new medium in art therapy.

In India, lack of mental health experts and institutional care are the obstacles to provide good mental health service. Moreover, providing traditional art medium such as paper, crayon and paint in rural places is difficult. On the other hand, the users of computer device and internet are increasing rapidly. Hence, technology-based program is one of the good solutions to approach clients and to provide mental health service.

This study focused on two objectives.

1. To develop an art therapy application.

2. To determine the effects of art therapy with the app on self-esteem of children in school setting.

Art therapy app, 'Art about Me' was designed by the art therapist and developed with a developer from CDI in Christ University. Confidentiality, portfolio, and stickers are included to meet the expectations of art therapists and clients. Paired sample t-test was used to determine the effects of art therapy on self-esteem of children.

Major findings of the study

The findings of the present study are the following:

- Confidentiality and portfolio to record clients' progress provided in the app are good elements to use in clinical settings.
- Using app was effective to build a rapport between a therapist and a client.
- The art therapy intervention with the app, 'Art about Me' was statistically significant in improving self-esteem of children in school setting.
- The art therapy helped clients be more aware of themselves, and their thoughts and emotions.

- The clients felt warm, comfortable and relaxed modifying their work whenever they wanted.
- Clients were able to see the world in a positive way and express gratitude.
- Clients became more motivated and confident for the future.
- Clients didn't need specific drawing skills. They felt free to express their thoughts and emotion without worrying their insufficient drawing skills.

Limitations of the Study

- There was a technical limitation for improving the backing up system and more delicate drawing.
- This study was conducted with only 16 school children. The sample size was small.

- One-group pre-test and post-test design without control group was used. Further study needs to conduct experimental study with control group.

- Follow-up was not implemented due to school counselors' resignations after finishing school academic year. It was not possible to connect students for the follow-up.

Implications of the Study

This study can help art therapists and counselors across the globe. Once a therapist downloads the app on his/her device such as a smart phone and a tablet pc, he/she can conduct art therapy in any place. Internet connection is not needed while using the app. Children are excited to use the technical device and rapport can be built fast. If children are nervous to use the device in the beginning, they become comfortable and relaxed after experiencing easy use of the app.

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APPENDIX I

Informed Consent Form – For School Counsellors

Dear Participant,

I am Jongsoon Koo and a PhD scholar of Christ University, Bengaluru. I am currently conducting a study that intends to examine effects of art therapy application for children.

You will join art therapy workshop and learn basic of art therapy and how to use an art therapy application in Tablet PC which is developed by the researcher. You will use the application in your art therapy sessions with your clients in the school.

Children will be asked to complete a questionnaire to assess their self-esteem before and after art therapy sessions. Children can stop participating in the art therapy sessions at any time. All information provided is treated as confidential.

If you have any questions, please feel free to contact me.

Thank you in advance for participating in my research.

Sincerely,

Jongsoon Koo

jongsoon.koo@res.christuniversity.in

APPENDIX II

Informed Consent Form – For Children's Parents

Dear Parent,

I am Jongsoon Koo and a PhD scholar of Christ University, Bengaluru. I am currently conducting a study that intends to examine effects of art therapy application for children.

If you consent to your child's participation in this study, he or she will be engaged in art therapy sessions with their school counselor. If you agree to your child's participation, please sign and date it and return it to the school.

Your children will be asked to complete one questionnaire. School counselor will use the art therapy application in tablet PC in the sessions. After two months, children will be asked to complete the same questionnaires.

Participation in this study is voluntary and they may stop participating in art therapy sessions at any time if they are like doing so. All information provided is treated as confidential. On request, the results of the study can be shared with you.

If you have any questions, please feel free to contact me. Thank you.

Sincerely,

Jongsoon Koo (jongsoon.koo@res.christuniversity.in)

Signature

APPEMDIX III

Children's Demographic Details

- Child's Date of Birth :
- Child's grade in school :
- Gender: Boy ( ) Girl ( )
- Mother tongue :
- Medium of Instruction in School :

APPENDIX IV

Instructions: Below is a list of statements dealing with your general feelings about yourself. If you strongly agree, circle ***SA***; if you agree with the statement, circle ***A***; if you disagree, circle ***D***; and, if you strongly disagree, circle ***SD.***

1. On the whole, I am satisfied with myself.	***SA***	***A***	***D***	***SD***
2.* At times, I think I am no good at all.	***SA***	***A***	***D***	***SD***
3. I feel that I have a number of good qualities.	***SA***	***A***	***D***	***SD***
4. I am able to do things as well as most other people.	***SA***	***A***	***D***	***SD***
5.* I feel I do not have much to be proud of.	***SA***	***A***	***D***	***SD***
6.* I certainly feel useless at times.	***SA***	***A***	***D***	***SD***
7. I feel that I'm a person of worth, at least equal to others.	***SA***	***A***	***D***	***SD***
8.* I wish I could have more respect for myself.	***SA***	***A***	***D***	***SD***
9.* All in all, I am inclined to feel that I'm a failure.	***SA***	***A***	***D***	***SD***
10. I take a positive attitude toward myself.	***SA***	***A***	***D***	***SD***

Scoring:

-For questions 1, 3, 4, 7, and 10 score SA=3, A=2, D=1, and SD=0: Your Total_____

-For questions 2, 5, 6, 8, and 9 score SA=0, A=1, D=2, and SD=3: Your Total_____

Grand Total_____

APPENDIX V

CHRIST
(DEEMED TO BE UNIVERSITY)
BENGALURU · INDIA

CENTRE FOR RESEARCH

CU: RCEC: APPROVAL: 02/18 19 February 2018

Ms Jongsoon Koo
PhD Scholar
Reg No 1630091
CHRIST (Deemed to be University), Bengaluru

Sub: Ethical Approval of the Study Titled "Development and Effectiveness of an Art Therapy Application for Children".

The Institutional Ethics committee has reviewed your application for ethical clearance for the Study titled "Development and Effectiveness of an Art Therapy Application for Children".

The committee has cleared your proposal for data collection after assessing the ethical aspects.

Sincerely,

T.S.Sam

Dr Tony Sam George
(Member Secretary to Ethics Committee)
Additional Director
Center for Research
CHRIST (Deemed to be University), Bengaluru

Hosur Road, Bengaluru - 560 029, Karnataka, India. www.christuniversity.in
Tel: +91 80 4012 9600 Fax: +91 80 4012 9000 email: mail@christuniversity.in

APPENDIX VI

1. Publication

Topic : “Art therapy for children with Autism Spectrum Disorder”

Journal name : *Art Therapy: Journal of the American Art Therapy Association*

https://www.tandfonline.com/eprint/CJGBUHDTVZBB7GPZGVZY/full?target=10.1080/07421656.2019.1644755

Art Therapy ›
Journal of the American Art Therapy Association
Volume 36, 2019 - Issue 4
Brief Report
Art Therapy for Children With Autism Spectrum Disorder in India
Jongsoon Koo & Elizabeth Thomas
Full Article
Figures & data
References
Citations
Metrics
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Get access
Abstract
The purpose of this study was to examine the effects of art therapy for 9 children with autism spectrum disorder in India using a pre–post experimental design with a control group. The Childhood Autism Rating Scale was used to measure symptoms before and after 8 individual art therapy sessions, and changes in the children's art development was also examined. Analysis of covariance results showed that art therapy was effective and content analysis of the drawings indicated progress seen in the developmental art stages, based on Lowenfeld theory. The positive
Translator disclaimer
3 GOOD HEALTH AND WELL-BEING

2. Presentation

Topic : Art Therapy for Children with Autism Spectrum Disorder

1-2 November 2019 in Ha Noi, Viet Nam

Healthy Behaviour in Modern Society
CERTIFICATE OF PARTICIPATION
This is to certify that
...Prof. Jongsoon Koo...
has participated in the International Conference
"Healthy Behavior in Modern Society"
held in Hanoi, Vietnam
on 1st & 2nd November 2019
Rector of the VNU University of Social Sciences and Humanities, Hanoi
TRƯỜNG ĐẠI HỌC KHOA HỌC XÃ HỘI VÀ NHÂN VĂN
NAFOSTED
UNIVERSITY OF GDAŃSK
Prof. Pham Quang Minh